REMARKS:

Claims 1, 4, 5-7, 9, 12, 13, 15, 17, 20, 21, 23, 25, and 26 are currently pending in the application.

Claims 2, 3, 8, 10, 11, 14, 16, 18, 19, 22, 24, and 27-49 have been previously canceled without *prejudice.*

Claims 6 and 26 have been previously withdrawn from further consideration.

Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 stand rejected under 35 U.S.C. § 103(a) over *Anandalingam,* "Hierarchical Optimization: An Introduction" (hereinafter "*Anandalingam*") in view of Official Notice.

Applicants respectfully submit that all of Applicants arguments and amendments are without *prejudice* or *disclaimer.* In addition, Applicants have merely discussed example distinctions from the cited prior art. Other distinctions may exist, and as such, Applicants reserve the right to discuss these additional distinctions in a future Response or on Appeal, if appropriate. Applicants further respectfully submit that by not responding to additional statements made by the Examiner, Applicants do not acquiesce to the Examiner's additional statements. The example distinctions discussed by Applicants are considered sufficient to overcome the Examiner's rejections. In addition, Applicants reserve the right to pursue broader claims in this Application or through a continuation patent application. No new matter has been added.

I.   Rejections Under 35 U.S.C. § 103(a) Over *Anandalingam* in View of Official Notice

Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 stand rejected under 35 U.S.C. § 103(a) over *Anandalingam* in view of Official Notice.

In rejecting Claim 1, the Examiner states the following:

> Anandalingam discloses a method for generating set of constraints, the method comprising generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths, each path comprising a plurality of states, each state having a

value, an inventory value, and a state value, the transition graph being generated by repeating the following for a the plurality of stages until a final stage is reached: determining the value of a successor state; calculating the inventory value of the successor state using the value and the inventory value of a predecessor state; and calculating the state value of the successor state using the value of the predecessor state; selecting a path of the plurality of paths according to the state values of the one or more states; and determining a schedule from the selected path. (*e.g. pg 1, pg 2, noting that a hierarchical optimization involves repeating for K levels an optimization of each level, the constraints of one level being the start of the next level*).

(28 April 2009, Final Office Action, pages 5-6). Applicants respectfully disagree with all of the above. More specifically, *Anandalingam* fails to disclose at least the Examiner relies does not "*generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths*, each path comprising a plurality of states, *each state having a price value, an inventory value, and a state value*, the transition graph being generated by repeating the following for the plurality of stages until a final stage is reached," as required by Applicants' Claim 1. Applicants respectfully direct the Examiner's attention to pages 1 and 2 of *Anandalingam*, provided below, on which the Examiner relies:

1. Problem formulation

Hierarchical optimization was first defined by Bracken and McGill [18,19] as a generalization of mathematical programming. In this context, the constraint region is implicitly determined by a series of optimization problems which must be solved in a predetermined sequence.

The problem is to find vectors x and v^i $(i = 1, \ldots, m)$ to

$$\text{minimize } f(x)$$
$$x \in X$$

$$\text{subject to } h_i(x) = \min_{v^i \in V^i} g^i(x, v^i) \geq 0, \quad i = 1, \ldots, m. \tag{1}$$

A variation of this problem is to find vectors x, u^i $(i = 1, \ldots, m)$ and v^i $(i = 1, \ldots, m)$ to

$$\text{minimize } f(x)$$
$$x \in X$$

$$\text{subject to } \overline{h}_i(x) = \max_{u^i \in U^i(x)} \min_{v^i \in V^i} g^i(x, u^i, v^i) \geq 0, \quad i = 1, \ldots, m. \tag{2}$$

If X, $U^i(\cdot)$ and V^i $(i = 1, \ldots, m)$ are convex sets, $f(x)$ is a convex function of x, and $g^i(x, u^i, v^i)$ is concave in x and u^i for every $v^i \in V^i$ $(i = 1, \ldots, m)$, then, with several mild restrictions, the mathematical program (2) is convex. If in addition $g^i(x, u^i, v^i)$ is convex in v^i, this program has a saddle point. Bracken and McGill [22] present solution techniques for (2) which employ the sequential unconstrained minimization technique (SUMT) of Fiacco and McCormick [26] for the outer problem. Bracken et al. [20] show that the mathematical program (1) can be transformed into (2) and is thus equivalent to it. Therefore, computational procedures based on SUMT can be used to solve (1) as well.

Recent research on hierarchical optimization problems has generalized the early work. In order to give mathematical formulations of such generalizations, consider a system comprised of K levels, each characterized by individual functions f^i, $i = 1, \ldots, K$, defined over a jointly dependent constraint set S, which are to be maximized by the respective players. Assume that decisions are made sequentially beginning with player 1 who has control over a vector $x^1 \in X^1$, followed by player 2 who has control over a vector $x^2 \in X^2$, down through player K who has control over a vector $x^K \in X^K$, where x^i are nonempty subsets of $\mathbb{R}^n$; $x^i \cap X^j = \varnothing$, $i \neq j = 1, \ldots, K$, $n = n^1 + \ldots + n^K$; and $x = (x^1, \ldots, x^K) \in \mathbb{R}^n$. Further assume that S is a compact subset of $\mathbb{R}^n$, x is in S, and each f^i maps S into $\mathbb{R}^1$. By implication, the choice made by a higher-level player may affect the choices available to a lower-level player through S; the strategy selected by any member of the system, however, may influence the outcome realized by any other member through the latter's objective function. The following nested hierarchical optimization problem captures this structure:

P1 $\text{maximize } f^1$ where x^2 solves
      $x^1 \in X^1$

      $\text{maximize } f^2$ where x^3 solves
      $x^2 \in X^2$

      $\vdots$

      $\text{maximize } f^{K-1}$ where x^K solves
      $x^{K-1} \in X^{K-1}$

      $\text{maximize } f^K$
      $x^K \in X^K$

As shown above, the portion of *Anandalingam* relied upon by the Examiner merely discloses, among other things, **selecting vectors to minimize a function,** which is not analogous to **"generating a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths**, each path comprising a plurality of states, **each state having a price value, an inventory value, and a state value**, the transition graph being generated by repeating the following for the plurality of stages until a final stage is reached," as recited in Claim 1. Applicants respectfully submit that the Examiner misinterprets the nested hierarchical optimization problem disclosed in *Anandalignam* as **"a transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths**, each path comprising a plurality of states, . . . **the transition graph being generated by repeating the following for the plurality of stages until a final stage is reached."** The mere fact that a nested hierarchical optimization problem **"involves repeating for K levels an optimization of each level, the constraints of one level being the start of the next level"** as asserted by the Examiner, does not render solving a hierarchical optimization problem for vectors to minimize a function to be analogous to generating a **"transition graph comprising a plurality of stages, each stage representing a time interval and comprising one or more states and a plurality of paths"** as required by Claim 1.

Accordingly, Applicants respectfully submit that independent Claims 1, 9, 17, and 25 contain unique and novel limitations that are disclosed by *Anandalingam* or the Examiner's Official Notice, whether taken individually or in combination. Thus, Applicants respectfully traverse the Examiner's rejection of claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 as obvious under 35 U.S.C. § 103(a) over the proposed combination of *Anandalingam* and the Examiner's Official Notice.

A. The Examiner's *Official Notice* is Improper Under MPEP § 2144.03

Applicants respectfully traverse the Official Notice because the asserted facts, as best understood by the Applicants, **are not supported by substantial documentary evidence or any type of documentary evidence** and appear to be the Examiner's opinions formulated using the subject Application as a template, which constitutes impermissible use of hindsight. Furthermore, under

these circumstances, it is inappropriate for the Examiner to take Official Notice without documentary evidence to support the Examiner's conclusion. (See MPEP § 2144.03). Applicants respectfully request the Examiner to produce authority for the Examiners Official Notice.

Applicants respectfully direct the Examiner's attention to MPEP § 2144.03 which states that only "in limited circumstances," is it "appropriate for an examiner to take official notice of facts not in the record or to rely on common knowledge in making a rejection." (MPEP § 2144.03). Furthermore, "Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are *capable of instant and unquestionable demonstration as being well-known*." (MPEP § 2144.03).

With respect to the subject Application, the Examiner's statement that the "Examiner takes Official Notice that it is old and well known in the art to factor in variations over time while modeling data," is not capable of instant and unquestionable demonstration as being well-known. (28 April 2009, Final Office Action, Page 8). As noted by the court in *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), "the notice of facts beyond the record which may be taken by the examiner must be '*capable of such instant and unquestionable demonstration as to defy the dispute*'" (citing *In re Knapp Monarch Co.*, 296 F.2d 230, 132 U.S.P.Q. 6 (C.C.P.A. 1961))." (MPEP § 2144.03(A)). (Emphasis Added).

Applicants respectfully remind the Examiner that "it is *never appropriate to rely solely on 'common knowledge' in the art without evidentiary support in the record*, as the principal evidence upon which a rejection was based." *Zurko*, 258 F.3d at 1385, 59 USPQ2d at 1697. As the court held in *Zurko*, an assessment of basic knowledge and common sense that is not based on any evidence in the record lacks substantial evidentiary support. *Id.* at 1385, 59 USPQ2d at 1697. See also *In re Lee*, 277 F.3d 1338, 1344-45, 61 USPQ2d 1430, 1434-35 (Fed. Cir. 2002)." (MPEP § 2144.03(A)).

"Ordinarily, there must be some form of evidence in the record to support an assertion of common knowledge." See *Lee*, 277 F.3d at 1344-45, 61 USPQ2d at 1434-35 (Fed. Cir. 2002); *Zurko*, 258 F.3d at 1386, 59 USPQ2d at 1697 (holding that general conclusions concerning what is "basic knowledge" or "common sense" to one of ordinary skill in the art without specific factual

findings and some concrete evidence in the record to support these findings will not support an obviousness rejection). "The examiner must provide specific factual findings predicated on sound technical and scientific reasoning to support his or her conclusion of common knowledge." See *Soli*, 317 F.2d at 946, 37 USPQ at 801; *Chevenard*, 139 F.2d at 713, 60 USPQ at 241. "The applicant should be presented with the explicit basis on which the examiner regards the matter as subject to official notice and be allowed to challenge the assertion in the next reply after the Office action in which the common knowledge statement was made." (MPEP § 2144.03(B)).

With respect to the subject Application, ***the Examiner has not properly Officially Noticed or not properly based the Official Notice on common knowledge***. For example, the Examiner states:

> [T]he Examiner takes ***Official Notice*** that it is old and well known in the art to factor in variations over time while modeling data. Therefore, it would have been obvious to a person having ordinary skill in the art to add in time constraints as one of the constraints in Anandalingam, for the purpose of making the model a more accurate depiction of reality.

(28 April 2009, Final Office Action, Page 8). (Emphasis Added). The above noticed Examiner's conclusory statement ***does not adequately address the issue that this statement is considered to be common knowledge or well-known in the art***.

II.   Applicants' Claims are Patentable over *Anandalingam* in view of Official Notice

Applicants respectfully submit that independent Claim 1 is considered patentably distinguishable over the proposed combination of *Anandalingam* and Official Notice. This being the case, independent Claims 9, 17, and 25 are also considered patentably distinguishable over the proposed combination of *Anandalingam* and Official Notice, for at least the reasons discussed above in connection with amended independent Claim 1.

Furthermore, with respect to dependent Claims 4, 5, 7, 12, 13, 15, 20, 21, and 23: Claims 4, 5, and 7 depend from independent Claim 1; Claims 12, 13, and 15 depend from independent Claim 9; and Claims 20, 21, and 23 depend from independent Claim 17. As mentioned above, each of independent Claims 1, 9, 17, and 25 are considered patentably distinguishable over *Anandalingam*

and Official Notice. Thus, dependent Claims 4, 5, 7, 12, 13, 15, 20, 21, and 23 are considered to be in condition for allowance for at least the reason of depending from an allowable claim.

For at least the reasons set forth herein, the Applicants respectfully submit that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 are not rendered obvious by the proposed combination of *Anandalingam* and Official Notice. The Applicants further respectfully submit that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 are in condition for allowance. Thus, the Applicants respectfully request that the rejection of Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 under 35 U.S.C. § 103(a) be reconsidered and that Claims 1, 4, 5, 7, 9, 12, 13, 15, 17, 20, 21, 23, and 25 be allowed.

CONCLUSION:

In view of the foregoing amendments and remarks, this application is considered to be in condition for allowance, and early reconsideration and a Notice of Allowance are earnestly solicited.

Although the Applicants believe no additional fees are deemed to be necessary; the undersigned hereby authorizes the Director to charge any additional fees which may be required, or credit any overpayments, to **Deposit Account No. 500777**. If an extension of time is necessary for allowing this Response to be timely filed, this document is to be construed as also constituting a Petition for Extension of Time Under 37 C.F.R. § 1.136(a) to the extent necessary. Any fee required for such Petition for Extension of Time should be charged to **Deposit Account No. 500777**.

Please link this application to Customer No. 53184 so that its status may be checked via the PAIR System.

Respectfully submitted,

29 June 2009   /Steven J. Laureanti/signed
Date   Steven J. Laureanti, Registration No. 50,274

                                            BOOTH UDALL, PLC
                                            1155 W. Rio Salado Parkway, Ste. 101
                                            Tempe AZ, 85281
                                            214.636.0799 (mobile)
                                            480.830.2700 (office)
                                            480.830.2717 (fax)
                                            steven@boothudall.com

                                            CUSTOMER NO. 53184